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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,422	12/05/2001	Toru Shirayanagi	PW 0277025 H7606US	3044

7590 12/16/2004

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EXAMINER	
GRIER, LAURA A	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 12/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/007,422	SHIRAYANAGI, TORU	
	Examiner	Art Unit	
	Laura A Grier	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. **Claim 13** is objected to because of the following informalities: line 1, "M" should read as "N"; and line 2, "N" should read as "M". For examination purposes, the limitation will be considered based on the suggested change. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 3, 4, 6, 8-11 and 13** are rejected under 35 U.S.C. 102(b) as being anticipated by Davis et al, U. S. Patent No. 5291557.

Regarding **claim 1**, Davis et al. (herein, Davis) discloses adaptive rematrixing of matrixed audio signals (figures 1A and 3A). Davis' disclosure comprises

an encode matrix (2), which reads on a matrix encoder, that receives 4 audio signals and outputs 2 weighted sum signals (L_T and R_T) of the 4 audio input signals (col. 8, lines 33-38 and figures 1A and 3A), which reads on converting the N-channel audio signals (where 'N' is an integer greater than zero), to M-channel audio signals (where 'M' is an integer smaller than 'N');

an encoder (fig. 1a- reference 16, and figure 3a - reference 48/50) includes a low-bit-rate transform or subband coder (which may operate in the digital domain) for encoding the 2 output

signals (L_T and R_T , now A and B) of the encode matrix and encode rematrix (col. 9, lines 21-47), wherein the digital coders generate coefficients (col. 4, lines 48-53), which reads on a matrix coefficient calculation unit, where the matrix coefficients are to be used in the decoding of the M-channels in the inverse transforms (col. 9, lines 30-36, and col. 12, lines 35-38);

and, as well the encoder inherently constitutes as a compression unit as evident by the fact that low-bit rate reduction takes place in the coders (col. 11, lines 54-67 and col. 12, lines 1-2) prior to transmission output or storage, which reads on compression on the M-channel audio signal, which are output therefrom together with the matrix coefficients;

the output of the encoder in input to a decoder (22, 26, and 28) via input (22) – figure (1b), which reads on a provided to a decoding device.

Regarding **claim 3**, Davis discloses everything claimed as applied above (see claim 1), Davis further discloses the encoder converting four signal channels to two output signals (col. 8, lines 33-38), which reads on N set to four or five while M is set to two, so the matrix encoder converts four-channel or five-channel audio signals to two-channel audio signals.

Regarding **claim 4**, Davis discloses a decoder apparatus (fig. 1b and fig. 3b) comprising a de-multiplex/de-format (62) coupled to bit-rate reduction decoders (68 and 70) for receiving compressed M-channel signals (64 and 66), wherein, the signals are subjected to bit-rate reduction in the decoders, which inherently reads on expansion of M-channels producing two signals (74 and 76) as evident by the fact bit rate reduction takes place in the decoder, which is an inverse of bit rate reduction that takes places in the encoder (col. 12, lines 11-50).

and calculations of the M-channels (two channel signals) using the matrix coefficients (frequency components – col. 4, lines 48-53) are implemented in the inverse transforms (84 and

86) coupling output to a decode matrix (28) for producing the N-channel audio signals, L', C', R', and S' channels - (col. 12, lines 11-50), with 'N' being an integer greater than "M', wherein the transforms use Discrete Sine and Cosine transforms applications (col. 11, lines 30-42) and coefficients (frequency components) are used to re-create the original signals, which reads a calculation unit, wherein it inherent that the calculation unit comprise at least N calculators (N=4) as evident by reproduction the four audio output channels .

Regarding **claim 6**, Davis discloses everything claimed as applied above (see claim 4). Davis (fig. 3b) discloses two channels (74 and 76), and after calculation via the inverse transforms coupled to rematrix and the decode matrix, L', C', R', and S' channel signals are output, which reads on M is set to two while N is set to four or five, therein as claimed.

Regarding **claim 8**, Davis discloses everything claimed as applied above (see claim 4). Davis further inherently discloses calculators with M multipliers as evident by the mathematical operations, Discrete Sine and Cosine transform applications within the inverse transforms, in which the outputs of the transforms are provided to the decode matrix, wherein the adders are inherently provided via the decode matrix for implementing the output of the N-channels, as evident by the fact that the a signal output signal of a single signal of the N-channel is based upon a combination of the left and right signals, and/or a portion thereof of the other signals to produce the N-channel signals as input into an encoder.

Regarding **claim 9**, Davis discloses everything claimed as applied above (see claim 4). Davis further discloses the components of the decoder, the low-bit rate decoder, and adaptive rematrix may be combined (col. 12, lines 56-66) with digital signal processing device, like the encoder (col. 9, lines 62-68 and col. 10, lines 1—and 39-42), and as well, it is inherent the

transforms (calculation units) of the decoder are DSPs as evident by the fact that the transforms of the encoder were implementing using DSP techniques, and the same quality of process is required in decoding for generating the original audio signal for output, which reads the calculation unit being actualized by a DSP.

Regarding **claim 10**, Davis et al. (herein, Davis) discloses adaptive rematrixing of matrixed audio signals. Davis' disclosure comprises an encoder (figures 1A and 3A) and decoder (figures 1B and 3B), wherein

an encode matrix (2), which reads on a matrix encoder, that receives 4 audio signals and outputs 2 weighted sum signals (L_T and R_T) of the 4 audio input signals (col. 8, lines 33-38 and figures 1A and 3A), which reads on the N-channel audio signals (where 'N' is an integer greater than zero) being subjected to encoding M-channel audio signals (where 'M' is an integer smaller than 'N'); an encoder (fig. 1a- reference 16, and figure 3a - reference 48/50) includes a low-bit-rate transform or subband coder (which may operate in the digital domain) for encoding the 2 output signals (L_T and R_T , now A and B) of the encode matrix and encode rematrix (col. 9, lines 21-47), wherein the digital coders generate coefficients (col. 4, lines 48-53), which reads on a matrix coefficient calculation and, as well the encoder obviously constitutes as a compression unit as evident by the fact that low-bit rate reduction takes place in the coders (col. 11, lines 54-67 and col. 12, lines 1-2) prior to transmission output or storage, which reads on compression on the M-channel audio signal to produce M-channel audio signals, which reads on the encoder;

a decoder (fig. 1b and fig. 3b) comprising a de-multiplex/de-format (62) coupled to bit-rate reduction decoders (68 and 70) for receiving compressed M-channel signals (64 and 66), wherein, the signals are subjected to bit-rate reduction in the decoders, which obviously reads on

expansion of M-channels producing two signals (74 and 76) as evident by the fact bit rate reduction takes place in the decoder, which is an inverse of bit rate reduction that takes places in the encoder (col. 12, lines 11-50); and calculations of the M-channels using the matrix coefficients (frequency components – col. 4, lines 48-53) are implemented in the inverse transforms (84 and 86) coupling output to a decode matrix (28) for producing the N-channel audio signals, L', C', R', and S' channels - (col. 12, lines 11-50), with 'N' being an integer greater than "M', wherein the transforms use Discrete Sine and Cosine transforms applications (col. 11, lines 30-42), wherein, the coefficients (frequency components) are used to re-create the original signals, which reads on the decoding device, wherein it is inherent that the calculation unit comprise at least N calculators (N=4) as evident by reproduction of the four original audio output channels.

Regarding **claim 11**, Davis discloses everything claimed as applied above (see claim 10). Davis further discloses the decoder, the low-bit rate decoder, and adaptive rematrix may be combined (col. 12, lines 56-66) with digital signal processing device, like the encoder (col. 9, lines 62-68 and col. 10, lines 1—and 39-42), which reads the decoder being actualized by a DSP.

Regarding **claim 13**, Davis discloses everything claimed as applied above (see claim 10). Davis (fig. 3b) discloses two channels (74 and 76), and after calculation via the inverse transforms coupled to rematrix and the decode matrix, L', C', R', and S' channel signals are output, which reads on M is set to two while N is set to four or five, therein as claimed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 2 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Li et al., U. S. Patent No. 6161088.

Regarding **claim 2**, Davis discloses everything claimed as applied above (see claim 1). However, Davis fails to disclose the compression in accordance with MPEG Standard.

Regarding compression in accordance with MPEG standard, in a similar field of endeavor, Li et al. (herein, Li) disclose a method and system for encoding a digital audio signal (figure 1). Li discloses encoder for providing a compressed audio signal which in generated in accordance with MPEG standard (col. 5, lines 26-30, and col. 4, lines 50-65)

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention Davis, which includes coding using psychoacoustics, by implementing compression in accordance with MPEG standard having psychoacoustic modeling characteristic, for the purpose of providing high quality audio compression and transmission as taught by Li, wherein MPEG standard compression technique is commonly used with pyschoacoustic modeling of an audio signal.

Regarding **claim 12**, Davis discloses everything claimed as applied above (see claim 1). However, Davis fails to disclose the compression in accordance with MPEG Standard.

Regarding compression in accordance with MPEG standard, in a similar field of endeavor, Li disclose a method and system for encoding a digital audio signal (figure 1). Li

discloses encoder for providing a compressed audio signal which in generated in accordance with MPEG standard (col. 5, lines 26-30, and col. 4, lines 50-65)

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention Davis, which includes coding using psychoacoustics, by implementing compression in accordance with MPEG standard having psychoacoustic modeling characteristic, for the purpose of providing high quality audio compression and transmission as taught by Li, wherein MPEG standard compression technique is commonly used with pyschoacoustic modeling of an audio signal.

6. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Laczko, Sr. et al., U. S. Patent No. 5845239.

Regarding claim 5, Davis discloses everything claimed as applied above (see claim 4). However, Davis fails to disclose expansion being performed in accordance with MPEG standard.

Regarding expansion in accordance with MPEG standard, Laczko, Sr. et al. (herein, Laczko) discloses audio data processing. Laczko's disclosure teaches the use of MPEG decompression, which constitutes MPEG expansion (col.1, lines 14- 22).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Davis, which includes psychoacoustic modeling characteristic during compression, by implementing expansion of the compressed audio channels in accordance to MPEG standard for the purpose of providing efficient and real-time decompression and broadcast of audio signals as taught by Laczko.

Response to Arguments

7. Applicant's arguments filed 7/12/04 have been fully considered but they are not persuasive.

The applicant argues that the prior art reference, Davis, fails to disclose the claimed invention as amended in respect to independent claims 4 and 10. However, the Davis reference and rejection has been maintained in respect the broadest interpretation of the claim language. In respect the applicant's argument on page 9 about the decoder, Davis does disclose a decoder for decoding/expanding the compressed signals and matrix coefficients from the encoder, even though the calculations coefficient may differ from the disclosed invention, in the decoding side of Davis, which includes the decoder, adaptive rematrix and decode matrix functions to provide a compressed number channels (M) reproduce the original number of channels (N).

In respect the applicant's argument on page 10 about remarks of the encoder, Davis does disclose the encoded signals (including coefficients/frequency components) processed via bit rate reduction, which indicates compression and the processed signals are further output to a decoder, reads on the compressed channel and matrix coefficients provide to a decoder as explained in the office action above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura A Grier whose telephone number is (703) 306-4819. The examiner can normally be reached on Monday - Friday, 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Laura A. Grier
December 10, 2004

XU MEI
PRIMARY EXAMINER